

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P81673PC00ER	FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. PCT/GB2004/000948	International filing date (day/month/year) 08.03.2004	Priority date (day/month/year) 14.03.2003
International Patent Classification (IPC) or national classification and IPC E02D13/04, E02D27/42		
Applicant CEMENTATION FOUNDATIONS SKANSKA LIMITED et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
 - sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)), containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

Date of submission of the demand 11.01.2005	Date of completion of this report 01.04.2005
Name and mailing address of the International preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer De Neef, K Telephone No. +31 70 340-4340



**INTERNATIONAL PRELIMINARY REPORT
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This report is based on translations from the original language into the following language, which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3 and 23.1(b))
 - publication of the international application (under Rule 12.4)
 - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-18 received on 20.08.2004 with letter of 18.08.2004

Drawings, Sheets

1/3-3/3 as originally filed

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. The amendments have resulted in the cancellation of:
 - the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages
- the claims, Nos.
- the drawings, sheets/figs
- the sequence listing (*specify*):
- any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-18
	No: Claims	
Inventive step (IS)	Yes: Claims	1-18
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-18
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

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Re Item V : Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. For reasons of clarity, Article 6 PCT, and with an attempt to have an antecedent for the definite term "the" in the expression "between the first plan position ... and the second ... " claim 1 was construed to read "... between the plan position of the upper positioning means and the plan position of the lower positioning means". This appears to correspond to dependent claim 2. Similarly, claims 11 and 12 were construed in such manner.
- 2.1 The document EP-A-0302707 (D1, cf. Fig. 4,7) is regarded as being the closest prior art to the subject-matter of claim 1 and discloses an apparatus for positioning an element in a borehole (2), the apparatus defining an interior space into which, in use, the element is lowered and comprising an upper positioning means (7,8) and a lower positioning means (9,10) for adjusting the plan position of the element within the interior space at upper and lower levels respectively.
- 2.2 The subject-matter of claim 1 differs from this apparatus in that the apparatus is being provided with a means to measure the difference in alignment between the plan position of the upper positioning means and the plan position of the lower positioning means (cf. § 1.). In document D1 the inclination of the element (steel column 19) is adjusted and confirmed with surveying techniques or by means of spirit levels (cf. col. 4, l. 46-59). The subject-matter of claim 1 is therefore new (Article 33(2) PCT).
- 2.3 The problem to be solved by the present invention may therefore be regarded as providing an alternative measurement means suitable for non-straight elements. Although plumb systems measure an inclination difference and consequently a difference in alignment between a top level and a random lower level, this problem, neither the solution of measuring the difference in alignment between the plan position of the upper positioning means and the plan position of the lower positioning means, has not been addressed in the prior art. For these reasons claim 1, within the interpretation of paragraph 1, fulfills the requirements of Article 33(1) PCT, its subject-matter involving an inventive step, Article 33(3) PCT.

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- 2.4 Claims 2-10 are dependent on claim 1 and therefore meet the requirements of the PCT with respect to novelty and inventive step.
- 3.1 For reasons of clarity, Article 6 PCT, and with an attempt to have an antecedent for the definite term "the" in the expression "within the interior space" claim 11 was construed to read "within an interior space defined by the apparatus", the indefinite reference in step (ii) "into an interior space" was construed to read "into the interior space".
- 3.2 The use of electrolevel gauges as such for measuring the difference in alignment between the first plan position of the element and the second plan position of the element does not allow measuring for non-straight elements on its own and appears to have been disclosed in the description and e.g. product claim 3 only in combination with a rigid/taut connection. To avoid any lack of clarity, Article 6 PCT, this connection was construed to be part of the combination of features of claim 11.
- 4.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 11. The subject-matter of claim 11 differs from this known method of positioning an element in a borehole in that (a) the apparatus is being provided with a means to measure the difference in alignment between the first plan position of the element and the second plan position of the element (taking into account cf. § 1) and (b) the difference in alignment is measured by means of one or more electrolevel gauges (within the interpretation of paragraph 3; Article 6 PCT the expression "the or each" lacks antecedent, therefore construed to read "one or more"). The subject-matter of claim 11 is therefore new (Article 33(2) PCT).
- 4.2 For similar reasons as mentioned in paragraph 2.3 independent method claim 11 appears to fulfill the requirements of Article 33(1) PCT, its subject-matter involving an inventive step, Article 33(3) PCT.
- 4.3 Claims 12-18 are dependent on claim 11 and therefore meet the requirements of the PCT with respect to novelty and inventive step.
5. Present claims 1-18 are considered industrially applicable and therefore meet the criteria of Article 33(4) PCT.

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EPO - DG 1

CLAIMS

20.08.2004

1. An apparatus for positioning an element in a borehole, the apparatus defining an interior space into which, in use, the element is lowered and comprising an upper positioning means and a lower positioning means for adjusting the plan position of the element within the interior space at upper and lower levels respectively, the apparatus being provided with a means to measure the difference in alignment between the first plan position of the element and the second plan position of the element.
2. An apparatus as claimed in claim 1, wherein the means to measure the difference in alignment between the first plan position of the element and the second plan position of the element extends between the upper and lower positioning means
3. An apparatus as claimed in claim 1 or 2, wherein the means to measure the difference in alignment between the first plan position of the element and the second plan position of the element, comprises at least one rigid or taut connection and one or more electrolevel gauges provided on the or each rigid or taut connection.
4. An apparatus as claimed in claim 3, wherein the rigid or taut connection comprises a wire.
5. An apparatus as claimed in claim 3, wherein the rigid or taut connection comprises a bar or tube.

6. An apparatus as claimed in claim 3, 4 or 5, wherein two electrolevel gauges are provided which are arranged so as to measure the inclination of the rigid or taut connection in mutually orthogonal directions.

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7. An apparatus as claimed in claim 6, wherein both of the electrolevel gauges are provided on a single rigid or taut connection.

10 8. An apparatus as claimed in any one of claims 1 to 7, wherein two rigid or taut connections are provided.

15 9. An apparatus as claimed in any preceding claim, wherein the upper and lower positioning means each comprise a guide means for adjusting the plan position of an element within the interior space.

20 10. An apparatus as claimed in claim 9, wherein the guide means comprises a first and a second pair of rollers which are moveable in mutually orthogonal directions across the interior space.

11. A Method of positioning an element in a borehole, the method comprising the steps of:

25 i) placing into the borehole an apparatus comprising an upper positioning means and a lower positioning means for adjusting the plan position of the element within the interior space at upper and lower levels respectively, the apparatus being provided with a means
30 to measure the difference in alignment between the first plan position of the element and the second plan position of the element;

- ii) lowering the element into an interior space defined by the apparatus to a required depth within the borehole; and
- iii) measuring the difference in alignment between the first plan position of the element and the second plan position of the element by means of the or each electrolevel gauge; and
- iv) adjusting the upper and lower positioning means to achieve the desired alignment between the first and second plan positions of the element.

12. A method as claimed in claim 11 wherein the means to measure the difference in alignment between the

first plan position and the second plan position comprises the use of:

- i) at least one rigid or taut connection extending between a first point at the level of the first plan position and a second point at the level of the second plan position, the first and second points being at an identical displacement from the element;
- ii) one or more electrolevel gauges provided on the or each rigid or taut connection, so as to measure the inclination of the rigid or taut connection.

13. A method as claimed in claim 12, wherein the rigid or taut connection comprises a wire.

14. A method as claimed in claim 13, wherein the rigid or taut connection comprises a bar or tube.

15. A method as claimed in claim 12, 13 or 14, wherein two electrolevel gauges are provided which are arranged

so as to measure the inclination of the rigid or taut connection in mutually orthogonal directions.

16. A method as claimed in claim 15, wherein both of
5 the electrolevel gauges are provided on a single rigid or taut connection.

17. A method as claimed in any one of claims 12 to 16, wherein two rigid or taut connections are provided.

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18. A method as claimed in any one of claim 12 to 17, wherein the or each electrolevel gauge is connected to an output metre.

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